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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,117

11/18/2003

Yasushi Inda

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EXAMINER

ECHELMMEYER, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

11/17/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/716,117	<b>Applicant(s)</b> INDA, YASUSHI	
	<b>Examiner</b> Alix Elizabeth Echelmeyer	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-14,16 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-14,16 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>4/27/09, 6/26/09, 6/30/09</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is in response to the amendment filed July 13, 2009. Claim 15 has been cancelled. Claims 1, 3-6, 8-14, 16, and 17 are pending and are rejected finally for the reasons given below.

### ***Information Disclosure Statement***

2. The information disclosure statement filed June 30, 2009 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. No copy of the Canadian Office Action is provided. It has been placed in the application file, but the information referred to therein has not been considered.

3. The information disclosure statement filed June 26, 2009 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. No explanation of relevance is provided for the Korean Office Action, Taiwan Office Action, or CN 1372705. It has been placed in the application file, but the information referred to therein has not been considered.

***Claim Rejections - 35 USC § 112***

4. The rejection of claim 15 under 112 first paragraph is withdrawn in light of the amendment.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3-6, 8-12, 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. (US 4,828,945) in view of Inda et al. (US 6,475,677).

Nagata et al. teach a solid electrolyte battery including a lithium ion conductive electrolyte material (abstract; column 1 lines 55-56).

The electrolyte layer is taught to be 10  $\mu\text{m}$  - 250  $\mu\text{m}$  (column 3 lines 63-68). Nagata et al. fail to teach specifically that the electrolyte must be less than 20  $\mu\text{m}$ , but do teach that the thickness of the electrolyte layer is important to the battery. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the thickness of the electrolyte layer such that all of the desired characteristics would be achieved. It has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05 IIB

Nagata et al. further teach that the solid electrolyte mixture is used because of its good adhesion to the electrodes (column 5 lines 42-46). One of ordinary skill in the art

Art Unit: 1795

at the time the invention was made would recognize that a mixed state of solid electrolyte and electrode would inherently occur between the electrolyte and electrode of Nagata et al., since in order for adhesion to take place, the electrolyte material would find its way into the roughened surface of the electrode material.

As for claims 3 and 14, the product by process limitations are not given patentable weight since the final product is the same. MPEP 2113.

With regard to claim 4, the electrolyte has conductivity of  $10^{-5}$  S/cm (column 1 lines 44-45).

Regarding claim 5, the lithium conductive powder is preferably in an amount of 55-95% (column 3 lines 47-55).

With further regard to claim 1 and regarding claims 8-10 and 16, Nagata et al. fail to teach that the lithium conductive material is a lithium ion conductive crystal or a lithium ion conductive glass-ceramic.

Inda et al. teach the use of a lithium ion conductive glass-ceramic in the solid electrolyte of a lithium battery (abstract).

Regarding claim 6, Inda et al. teach a lithium ion conductive glass-ceramic, thus meeting the limitation of claim 1. Claim 6 does not further limit the parent claim and is considered rejected because claim 1 is rejected.

Art Unit: 1795

As for claims 11 and 17, Inda et al. teach a powder of 20  $\mu\text{m}$ , but fail to teach that the powder is less than 1  $\mu\text{m}$  (abstract). Nagata et al. teach that the particle size is not defined (column 3 lines 1-3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the best particle size for the thickness of the electrolyte.

As for claim 12, Nagata et al. teach that the powder is in a polymer medium (column 3 lines 47-55).

Inda et al. further teach that the lithium ion conductive glass-ceramic is desirable in solid electrolyte because it has high ion conductivity, provides mechanical strength even when the thickness of the electrolyte is reduced, has high cell capacity, improved charging-discharging characteristics and a long, stable cell life (column 1 lines 50-58).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a lithium ion conductive glass-ceramic as the lithium material of Nagata et al. as taught by Inda et al.

7. Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Nagata et al. in view of Inda et al. as applied to claim 9 above, and further in view of Munshi et al. (US 6,645,675).

The teachings of Nagata et al. and Inda et al. as discussed above are incorporated herein.

Nagata et al. in view of Inda et al. fail to teach the inclusion of a lithium inorganic salt in the solid electrolyte.

Munshi et al. teach the use of a salt in a solid electrolyte also including a polymer and a lithium ion conductive inorganic substance to aid in ion mobility (column 2 lines 12-17; column 6 lines 29-35).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a lithium salt in the electrolyte of Nagata et al. in view of Inda et al. as taught by Munshi et al. in order to aid in ion mobility.

### ***Response to Arguments***

8. Applicant's arguments filed July 13, 2009 have been fully considered but they are not persuasive.

First, Applicant argues that Nagata et al. do not teach good adhesion between the electrolyte layer and the electrode, and therefore there is no mixed state at the interface. The examiner disagrees with Applicant's interpretation of Nagata et al. It is unclear how Applicant has interpreted Nagata et al. to reach the conclusion that there is not good adhesion between the electrode and the electrolyte. Figure 1 shown in the Remarks (see page 6) does not show that there is no mixed state, nor that there is not good adhesion. Further, Nagata et al. positively recite good adhesion between the two layers, for example in the lines of column 5 that Applicant has cited (column 5 lines 42-46).

Additionally, the examiner does not understand Applicant's statement in the fourth and fifth lines of page 6, where it is stated, "such inconvenience dose not exist and good adhesion can be obtained ..."

In regard to the mixed state, as discussed in the rejection provided above, the mixed state is inherent. The comparison of the two figures provided in the Remarks is not convincing, since the scale of the figures is not provided - Figure 2 could simply be a close-up view of the interface shown in Figure 1.

With regard to Applicant's arguments concerning Inda et al., the examiner is not convinced. Applicant states that it is taught in the instant specification that the thickness of the electrolyte should be 30-80  $\mu\text{m}$  to provide sufficient mechanical strength. Yet, the combination of Nagata et al. and Inda et al. yields an electrolyte having reticulate material to provide mechanical strength. The statement that Inda et al. does not disclose any electrolyte with a thickness of less than 50  $\mu\text{m}$  is immaterial - Nagata et al. teach discovering the most desirable thickness. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

As for Applicant's arguments concerning Munshi et al., the Munshi et al. reference is relied upon to teach lithium salts, which the skilled artisan would recognize would not be affected by the consistency of the solid electrolyte.



***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795

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